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10/587,701	07/27/2006	Sebastien Joseph Roy	AP893USN	3530

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EXAMINER	
NGUYEN, DUC M	
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2618	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/587,701	ROY, SEBASTIEN JOSEPH	
	Examiner	Art Unit	
	DUC M. NGUYEN	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *3,6,8,12,15 and 17* is/are allowed.

6)☒ Claim(s) *1-2, 4-5, 7, 9-11, 13-14, 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This action is in response to applicant's response filed on 5/15/09. Claims 1-17 are now pending in the present application. **This action is made final**.

Claim Rejections - 35 USC 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims **1, 9, 10** are rejected under 35 U.S.C. 103(a) as being unpatentable by **Li et al** (US 2004/0146024), hereafter **Li'024** in view of and **Li et al** (US Pat. Number **6,795,392**), hereafter **Li'392**.

Regarding claim **1, Li'**024 discloses

an array receiver for processing signals received from a plurality of transmitting users via an array antenna having an array of N antenna elements providing a set of antenna signals, each comprising information from each user, wherein said receiver has a common preprocessing section for sampling each of the antenna element signals as claimed (see Fig. 2 regarding input signals i[n] from M antennas and [0022] regarding sampled process), and

processing the samples of at least some of said antenna signals i[n] to form a plurality of basis signals d[n] together having **fewer** space-time dimensions than the

space-time dimensions of the combined antenna signals (see Fig. 2 regarding output signals d[n]), wherein one skilled in the art would recognize that the number of antennas can be more or less regardless of the number of users as disclosed by **Li'392** (see col. 3, lines 20-24 regarding one or many antennas), and

a plurality of signal processing units (joint detectors JD) each having a plurality of inputs coupled to the common preprocessing section for receiving all of the basis signals, each processing unit processing and combining said basis signals to produce a respective one of a set of estimated received signals each for a corresponding desired one of the users (see Fig. 4 regarding output signals S[n] and [0046 – 0064]),

the common preprocessing section comprising filtering means for combining all of the antenna signals Xi to provide said plurality of basis signals d[i], each of the basis signals comprising a different combination of the antenna signals, each of the signal processing units combining the basis signals to provide a user-specific output signal S[i] (see Fig. 3 and [0038 – 0045]), and

updating means for periodically updating parameters of the filtering means used for deriving each particular basis signal such that each user-specific output signal will exhibit a desired optimized concentration of energy of that desired user's received signal as received by the array antenna (see [0033-0048], noting for "maximum signal energy" in [0038]).

Therefore, by simply proving a large number of antennas with a smaller number of detected user (i.e, M antennas > N users), claimed limitation are made obvious by Li'024 in view of Li'392.

Regarding claims **9, 10**, the claims are interpreted and rejected for the same reason as set forth in claim 1 above.

3. Claims **1-2, 4-5, 7, 9-11, 13-14, 16** are rejected under 35 U.S.C. 103(a) as being unpatentable by **Huang** (US Pat. Number **6,301,293**) in view of **Hara** (US Pat. Number **6,934,323**) and **Li et al** (US Pat. Number **6,795,392**), hereafter **Li'392**.

Regarding claim **1, Huang** discloses

an array receiver for processing signals received from a plurality of transmitting users via an array antenna having an array of P antenna elements providing a set of antenna signals, respectively, each comprising information from each user, wherein said receiver has a common preprocessing section for sampling each of the antenna element signals (see Figs. 3, 7 regarding signals r_1 to r_p and detector 16), where one skilled in the art would recognize that the receiver in **Huang** would sampling each of the antenna element signals in the similar way as mentioned by **Hara** (see col. 2, lines 44-51 and col. 6, lines 51-53 regarding the sampling process for baseband signals),and

processing the samples of at least some of said antenna signals to form a plurality of basis signals together having **fewer** space-time dimensions (i.e, k users) than the space-time dimensions (i.e, p antennas) of the combined antenna signals (see **Huang**, Figs. 3, 7 regarding output signals y_{CON} from the detector 16 which would read on the claimed "basis signals y"), wherein one skilled in the art would recognize that the p number of antennas can be selected for any arbitrary number regardless of the

desired k number of users (i.e, **p > k** or p < k) in the similar way as mentioned by **Li'392** (see col. 3, lines 20-24 regarding the selection of one or many antennas), and

a plurality of signal processing units each having a plurality of inputs coupled to the common preprocessing section for receiving all of the basis signals, each processing unit processing and combining said basis signals to produce a respective one of a set of estimated received signals, each for a corresponding desired one of the users (see Huang, Figs. 3, 7 regarding linear combiner matrix W_A and estimated signals b_k^ for K users),

the common preprocessing section comprising filtering means for combining all of the antenna signals to provide said plurality of basis signals (see **Huang**, Figs. 3, 7, regarding detector 16 comprising matched filters 10 and weighted channel coefficient vectors h, c. See also **Hara**, Fig. 2 regarding weighted vector W), each of the basis signals comprising a different combination of the antenna signals, each of the signal processing units combining the basis signals to provide a user-specific output signal (see Huang, Figs. 3, 7 regarding linear combiner matrix W_A), and

updating means for periodically updating parameters of the filtering means used for deriving each particular basis signal such that each user-specific output signal will exhibit a desired optimized concentration of energy of that desired user's received signal as received by the array antenna (see **Huang**, col. 5, line 42 – col. 6, line 35 regarding detector 16 and col. 7, lines 15 – 43, wherein it is clear that the MMSE criterion would obviously exhibit a desired optimized concentration of energy of that desired user's received signal).

Therefore, the claimed limitations are made obvious by **Huang** in view of **Hara** and **Li**.

Regarding claim **2, Huang** would teach a receiver according to claim 1, wherein the updating means comprises means for adjusting said parameters in dependence upon channel characteristics of all user channels (see **Huang**, col. 5, lines 42-50 regarding weighted/coefficients h^, c^, that would obviously be updated in the similar way as of the updating of eigenvector in **Hara**, see col. 11, lines 1-5, which clearly suggest that the eigenvector/weight is updated for every sampling period in dependence upon channel characteristics of all user channels with the correlation matrix Φ).

Regarding claim **4, Huang** would teach the number of basis signals is equal to the number of desired user signals (see Figs. 3, 7).

Regarding claim **5,** the claim is rejected for the same reason as set forth in claim 1 above. In addition, it is clear the common preprocessing section (detector 16 in Fig. 3, 7 of Huang) would comprise (k users) dominant subspace filters and would producing a set of basis signals that would obviously project the input signal of nth user carrying the most energy to the output of the nth basic signal as claimed (i.e, obtained via matched filter and weighted coefficients as an obvious desired result for any filter design intended for a multi-user detection).

Regarding claim **7, Huang** would teach a receiver according to claim 1, wherein the filtering means comprises a plurality of filters each comprising a filter matched to a

respective one of the desired users (see Fig. 3, col. 7, lines 15-18 regarding matched filters 10).

Regarding claims **9, 10**, the claims are interpreted and rejected for the same reason as set forth in claim 1 above.

Regarding claims **11, 13, 14, 16**, the claims are interpreted and rejected for the same reason as set forth in claims 2, 4, 5, 7 above, respectively.

Allowable Subject Matter

4. Claims 3, 6, 8, 12, 15, 17 are allowed.

Response to Arguments

5. Applicant's arguments filed 5/15/09 have been fully considered but they are not persuasive.

In the Remark, Applicant contends that

Rejection of claims 1, 9 and 10 under 35 U.S.C. 103(a)
In paragraph 4 of the Office Action, claims 1, 9 and 10 were rejected under 35 U.S.C. 103(a) as unpatentable over US 2004/0146024 (Li'024) in view of US 6,795,392 to Li'392). Applicant respectfully traverses this rejection.
The systems disclosed in the references Li'024 and Li'392 cannot be combined without modification of one or both to such an extent that it/they would be rendered unsuitable for their intended purpose. Li'024 is specifically concerned with CDMA systems, and discloses embodiments that make use of features specific to such CDMA wireless systvms (such as code correlation). Conversely, Li'392 is specifically concerned with OFDM systems and discloses embodiments that make use of features specific to such OFDM wireless systems. A person of ordinary skill in this art would not look to an OFDM receiver for help in solving a problem relating to a CDMA system, or vice versa, since the CDMA and OFDM are wholly different types of communication system.

In response, the examiner asserts that the combination is directed to the number of antennas with respect to the number of users, not to combine a CDMA system with an OFDM system.

A comparison of Fig. 2 of Applicant's specification and Fig. I of Li'024 shows that the main difference lies in the addition of joint detectors to the right of the processing chain. The use of the terminology "'joint detector" clearly refers to a CDMA-type system, where the use of codes which, in principle, should be orthogonal among themselves does not necessarily warrant joint processing or interference suppression. In other words, the CDMA concept itself was intended to make interference suppression unnecessary since simply passing the signal through a filter matched to the code (or correlator) would reduce all other signals to white noise. However, it was found in "real world" systems that this was not always the case (because of the near-far effect, or loss of orthogonality between codes due to channel effects or other); hence the development of joint detection techniques in this context.
Regarding claim 1, the Office Action asserted that the following portion:
An array receiver for processing signals from a plurality of transmitting users via an array antenna having an array of N antenna elements providing a set of antenna signals, each comprising information from each user, wherein said receiver has a common preprocessing section for sampling each of the antenna element signals..,)> read onto Fig. 2 and paragraph [0022] of Li'024. With all due respect, the similarity is superficial; when the structure and functionality of the preprocessing section are considered, it is apparent that they are not the same.
Regarding the following extract of claim 1:
(and processing the samples of at least some of said antenna signals i[n] to form
a plurality of basis signals d[n] together having fewer space-time dimensions than
the space-time dimensions of the combined antenna signals... >),
the Office Action asserted that one skilled in the art would recognize that the number of antennas can be more or less regardless of the number of users as disclosed by Li'392 (col. 3, lines 20-24).
With all due respect, the relationship between the number of antennas and the number of users is not relevant to the above portion of the claim. What is stated there is that the preprocessing section effects a reduction in the total number of space-time dimensions (as defined in general by the number of antennas and the memory length - defined by the delay spread with respect to symbol duration - of the channels) which will be forwarded for further processing, thus enabling a reduction in processing complexity.
It should also be noted that, as illustrated in Fig, 1 of Applicant's application, Applicant's preprocessing section derives each of the basis function outputs as a function of all antennas. This is different from Li'024, where no cross-coupling of antenna signal paths occurs before the spatial combiner blocks.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., details of basic signals y[n] that would distinguish the claimed basic signals from the d[n] signals in Li'024) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Here, the examiner asserts that the signals d[n] in Li'024 would read on the claimed basic signals y[n], the filter blocks 204, code correlators 206 and spatial combiner 212 would read on the claimed "preprocessing section", in which Fig. 2 also

shows cross-coupling of antenna signal paths occurs before being combined by the spatial combiner blocks.

Likewise, no direct relationship is observed in Li'392. Although the latter makes use of an eigen-matrix approach and thus derives basis functions, they are used for channel estimation in frequency, a prerequisitc to equalization in OFDM systems, which is unrelated to interference reduction. In Applicant's preprocessing section, the basis functions are derived over space and time (not frequency) and serve to separate multiple user signals (thus combatting mutual interference) with reasonable complexity.

In response, the examiner asserts that Li'392 is not used for rejecting the claimed basic signals. In fact, Li'024 teaches the claimed basic signals as d[n] signals and clearly show the d[n] is derived from over space-time (see [0025]).

The Office Action then equated the "plurality of signal processing units" of claim 1 to joint detectors. They are not joint detectors, either in the CDMA sense or otherwise. Moreover, they cannot be equated to the spatial combiners in Li'024 (box 212 in Fig. 2) because no code correlation occurs ahead of the said signal processing units, In effect, the job of the spatial combiners in Li'024 is split up between the preprocessing section and the downstream signal processing units in Applicant's system. Also, no code correlation occurs in Applicant's system, since Applicant assumes no foreknowledge of any such signal characteristic.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the basic signal does not utilize code correlation) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The Applicant's signal processing units perform beam forming and nulling and produce "a respective one of a set of estimated received signals each for a corresponding one of the users." This is then routed to a classical detection device (80/0 through 80/M in Fig. 1 of Applicant's patent specification), not to a ioint detector as in Li'024.
Yet another difference is that the basis functions which are input to each spatial combiner are not necessarily produced using foreknowledge of codes (such as code correlation, box 206 in Li'024), but can rely solely on knowledge of channels (delay profile, spatial signature, etc.) to maximize energy related to a specific user.
Also, each signal processing unit in the Applicant's specification takes a basis functions as inputs to

perform the beam forming and nulling, instead of solely the signals related to one user (as in Li'024). In Li'024, the mention of maximizing energy in paragraph [0038] relates to the spatial signatures used in computing weights for the spatial combiners. This is not relevant to Applicant's maximizing of energy in the basis functions, which are produced by the preprocessing section.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the beam forming and nulling) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Here, each "joint detector unit" in Li'024 for processing signals would read on claimed "signal processing unit"

Another major difference as compared with Li'024 is that, in Applicant's specification, joint processing occurs both in the preprocessing section (of all antenna signals, with the goal of reducing the total number of dimensions for further processing, thus affording opportunities for reduced computational complexity), and in the signal processing sections,
It is clear, therefore, that the statement in the Office Action "Therefore, by simply providing a large number of antennas with a smaller number of detected users..." is irrelevant.
In view of these many differences, even in the unlikely event that a skilled person were to try combining the two references Li'024 and Li'392, the end result would not be the system of Applicant's claims 1, 9 and 10, It is submitted therefore that claims 1, 9 and 10 are patentable over the applied references.

In response, the examiner asserts that the d[n] signals clearly perform a join processing of input signals from antennas and reduce the dimension of M antennas to N dimension of users, the joint detector clearly detect each user-specific output signal that would exhibit a desired optimized concentration of energy of that desired user's received signal as received by the array antenna. In fact, any joint detector formula (for example, maximum likelihood, mean square error or SNR) used in a multi-user detection process would intend/propose to exhibit a desired optimized concentration of

energy (intended use limitation) of that desired user's received signal as received by the array antenna.

Applicant further contends that

Rejection of claims 1, 2, 4, 5, 7, 9-11, 13, 14 and 16 under 35 U.S.C. 103(a)
In paragraph 5 of the Office Action, claims 1, 2, 4, 5, 7, 9-11, 13, 14 and 16 were rejected under 35 U.S.C. 103(a) as unpatentable over US 6,301,293 (I-luan8) in view of US 6,934,323 (Hera) and US 6,795,392 (Li'392). This rejection is respectfully traversed.
It should be observed first and foremost that both Huang and Hara are clearly CDMA-specific disclosures. Again, the preprocessing section in Huang (box 16 in Fig. 2) assumes some foreknowledge of codes, using such codes to extract each resolvable path in a standard RAKE receiver structure. While this preprocessing section might produce signals which "maximize 'energy" for each user, it does so by relying on foreknowledge of codes, and the very wide bandwidth of CDMA signals (which makes for resolvable paths) enables a nice reduction in the manner of dimensions, i,e., no equalization is required beyond the preprocessing section. This is not possible in the general case.
In Applicant's specification, the basis functious (yo, ... YM) are actually vectors as indicated by the bold type notation. This indicates that there might be more than one output signal from the preprocossing section associated with any one user. The number of such signals is ~~determined~~ according to the severity (i.e. memory length) of the channel, as well as the desired cost / complexity tradeoff.
Hara discloses a two-step structure which might at first glance seem similar to that disclosed in Applicant's specification and claimed in claim 1, As mentioned above, however, in "real world" CDMA applications it has been found that the orthogonality between codes could not be maintained, and thus, that some correlation could be observed at the receiver which was of detrimental to performance. Hara's solution is to "decorrelate" the signatures in the preprocessing step. This is very different from the present invention. Again, no foreknowledge of codes or CDMA context is assumed. Furthermore, the preprocessing sect/on seeks to produce signals which "maximize" energy for each user, irrespective of any other signals (interference which might be present, In other words, no joint processing (in terms of user signals) occurs in the preprocessing section.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., Applicant's argument regarding differences or features of basic signals y[n] that would distinguish the claimed basic signals y[n] from the y[k] signals in Huang) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Here, Applicant needs to point out what claimed limitation that prior arts fail to teach, not providing a general allegation that the claims or the application define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Furthermore, the Office Action states on page 6: " ,,. wherein it is clear that the MMSE criterion would obviously exhibit a desired optimized concentration of energy of that desired user's received signal," With all due respect, this is not so. The MMSE criterion maximizes the signal-to-(interference-plus-noise) ratio; not the signal energy itself.

In response, the examiner asserts that the MMSE criterion maximizes the signal-to-(interference-plus-noise) ratio and would obviously exhibit a desired optimized concentration of energy of that desired user's received signal. In fact, any detector formula (for example, maximum likelihood, least mean square error or SNR) used in a multi-user detection algorithm/process would intend/propose to exhibit a desired optimized concentration of energy (intended use limitation) of that desired user's received signal as received by the array antenna.

The goal is to produce a number of basis functions for further processing, The preprocessing does not therefore tackle interference in any way, but leaves that job to the subsequent signal processing sections. The use of the MMSE criterion necessarily implies a direct attack on interference.

Again, the claims does not recite any features or any equation or any formula that would distinguish the claimed signal processing unit from the MMSE processing criterion. In fact, any detector formula (for example, maximum likelihood, least mean square error or SNR) used in a multi-user detection algorithm/process would intend/propose to exhibit a desired optimized concentration of energy of that desired user's received signal as received by the array antenna (by maximizing desired user energy while minimizing energy from other users, namely interferences).

Applicant further contends that

Regarding claim 2, the Office Action further asserts that the adjustment of parameters in dependence upon channel characteristics is obvious based on Huang and Hea'a. Again, it should be noted that the channel parameters updated in Huang are the resolvable path gains, in a purely CDMA-specific context. The Office Action then states " ... that would obviously be updated in the similar way as of the updating of eigenvector in Hara, see col. I 1, lines 1-5, which clearly suggest that the eigenvector / weight is updated for every sampling period in dependence upon channel characteristics of all user channels with the correlation matrix phi". Again, no correlation matrix is invoked in the present invention and such a correlation matrix necessarily involves knowledge of the users' codes in a CDMA context.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., no correlation matrix is invoked or user codes) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding claim 4: The claim is dependent upon claim 1 and so patentable with it.
Moreover, the Office Action states "Huang teaches that the number of basis signals is equal to the number of desired user signals." This is not quite correct, and not in line with the Fig. 1 of the Applicant's patent application.

In response, it is not clear what argument is included in the above statement. However, Huang teaches that the number of basis signals is equal to the number of desired user signals (see Figs. 3, 7 regarding the dimension of y(k) and b(k) signals).

The Office Action also states (on page 7):
"Regarding claim 5, the claim is rejected for the same reason as set forth in claim 1 above. In addition, it is clear the common preprocessing section [...] would comprise (k users) dominant subspace filters and would producing a set of basis signals that would obviously project the input signal of nth user carrying the most energy to the output of the nth basic signal as claimed (i.e. obtained via matched filter and weighted coefficients as an obvious desired result for any filter design intended for a multi-user detection)."
Again, this presumes a CDMA context. There is no matched filter or correlator anywhere in the Applicant's preprocesslng section, since Applicant assumes neither foreknowledge of user codes nor a CDMA context. Also, the difficulty of the problem is different in a "non-CDMA context The multi-user structure of Huang, for example, can rely on the codes as a first processing step (matched filter bank) thus considerably reducing interference, and also on the resolvable paths afforded by the large bandwidth of CDMA signals to avoid any form of explicit equalization. In general, a non-CDMA array receiver would also have to perform equalization and the number of taps to adapt would be

proportional to both the number of antennas and tho memory length of the channel (and thus could be considered excessive, in terms of computational complexity), Thus, the preprocesing section aims to reduce this excessive number of dimensions by producing a certain number of basis functions, based on channel knowledge alone, (as specified by claim 2), and not on any user codes (although user codes could be exploited to gain such channel knowledge).
It is submitted, therefore, that claims 1, 2, 4, 5, 7, 9-11, 13, 14 and 16 are patentable over Huang, Hara and Li'392 whether taken individually or in combination.
Accordingly, it is submitted that all claims of record arc patentable and early and favourablo reconsideration of the application is respectfully requested.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., no matched filter, based on channel knowledge alone, and not on any user codes, etc) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

For foregoing reasons, the examiner believes that the pending claims (1, 2, 4, 5, 7, 9-11, 13, 14, 16) are not allowable over the cited prior art.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. **Any response to this final action should be mailed to:**

Box A.F.

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(571) 273-8300 (for **formal** communications intended for entry)

(571)-273-7893 (for informal or **draft** communications).

Hand-delivered responses should be brought to Customer Service Window, Randolph Building, 401 Dulany Street, Alexandria, VA 22314.

Any inquiry concerning this communication or communications from the examiner should be directed to Duc M. Nguyen whose telephone number is (571) 272-7893, Monday-Thursday (9:00 AM - 5:00 PM).

Or to Nay Maung (Supervisor) whose telephone number is (571) 272-7882.

/Duc M. Nguyen/

Primary Examiner, Art Unit 2618

Aug 18, 2009